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THE BRITISH JOURNAL

OF

OPHTHALMOLOGY

AUGUST, 1922

COMMUNICATIONS

REPORT TO THE COMMITTEE OF THE LANG RESEARCH SCHOLARSHIP

SOME CAUSES OF AMAUROSIS IN INFANTS

BY

R. FOSTER MOORE, BASIL T. LANG, HUMPHREY NEAME AND P. G. DOYNE.

LANG RESEARCH SCHOLARS, 1913-1922

INFANTS are often brought up to hospital because their mothers are anxious with regard to their sight. The actual complaint of the mother varies. It may be that she thinks that the infant does not notice objects around it, that it has to feel for its bottle, or that its eyes look " queer," or again that the eyes are continually " moving," or, finally, that though at first it seemed to see quite well, latterly the sight has failed and it does not seem to see, and, when crawling, knocks into objects in its way.

It is obvious that a variety of factors may be acting to produce this state of affairs, and it was with the object of investigating all possible causes which might affect the visual powers of infants that this research was started in 1913.

Sixty cases have now been observed—some of them over a period of nine years—and it was thought that sufficient material had been obtained to warrant a review of the whole series of cases.

The primary qualification for the admittance of any case into the series was the mother's statement that the infant did not appear

to see. But, in some cases, on investigation, it was found that the mother's statement was erroneous, that the child fixed the light well, and that there were no other signs, such as nystagmus, which might suggest imperfect visual powers. Such cases, of course, were not included.

In order to facilitate the investigation and to establish a uniformity, a scheme of points to be inquired into was made out :—

1. Why patient was brought up? What did the parents first notice?
2. Are the parents related?
3. Number of pregnancies? Miscarriages? Position of patient in family?
4. Similar cases in family or relatives?
5. Wassermann reaction?
6. Delivery: normal, instrumental, protracted?
7. Feeding: breast, artificial?
8. Any history of acute illness?
9. Fits; urine?
10. General condition?
11. Position of eyes: parallel or deviating?
12. Ocular movements: full or limited?
13. Eyes held stationary or moving?
14. Nature of nystagmus?
15. Vision, light fixation?
16. Pupils: diameter, reaction?
17. Colour of iris?
18. External appearances of eyes and appendages?
19. Condition of lens?
20. Media?
21. Fundus: discs, macula, general?
22. Refractive error?
23. Eye rubbing?
24. Evidences of congenital syphilis?

In considering these cases as a whole it must be remembered that all of them, when first seen, had defective vision.

Certain features stand out. There are the cases of true temporary amaurosis; the cases which became mentally defective; and there is the close relationship between delay in the development of the fixation reflex and the presence of albinism. Then the association of certain signs or symptoms attracts attention, the significance of eye-rubbing for example.

It seems best, therefore, to attack each feature independently, but there must, of course, be much overlapping and repetition as one case may figure under several different headings.

Temporary Amaurosis

This condition of temporary or fleeting amaurosis of infancy has been described by Nettleship (*Trans. Ophthal. Soc., U.K.*, 1884, IV, 243), by Gay (*Royal London Ophthal. Hosp. Reports*, 1893, XIII, 404), and Sydney Stephenson (*Reports of Soc. for Study of Diseases of Children*, 1902, II, 276). The children affected are usually under two years of age. There is a history of a sudden illness associated with fits, head retraction and vomiting. Immediately following upon this it is noticed that the child no longer appears to see. This failure of sight may be of short duration, and clears up soon after the general illness has subsided. But there is a more or less definite relation between the length and severity of the illness and the speed and completeness of the recovery of sight. In some cases, indeed, with a similar onset, no recovery of sight ensues, and though these cases cannot, naturally, be classed under this heading, nevertheless the underlying pathological process would seem to be the same. In the cases in which no recovery of sight occurs, atrophy of the optic discs is usually present, whereas in the cases of true temporary amaurosis no fundus abnormality is to be seen. It has been suggested that the pathological basis of these cases consists in a basal meningitis which seals the foramen of Majendie and so causes a distension of the third ventricle. This distension will produce pressure upon the optic chiasma, and, in consequence, interference with the conductivity of light impulses to the cortex. In those cases in which the amaurosis is temporary, it is suggested that the sealing of the foramen of Majendie is of short duration only, whereas in those cases in which permanent blindness ensues it is suggested that the closure of the foramen of Majendie is for a sufficiently long period to cause permanent damage to the chiasma, by reason of the prolonged distension of the third ventricle. In the present series of cases two typical cases of this condition were met with.

Case 8. Female child, aged ten months, was first seen October 27, 1913. The youngest of nine, seven surviving. The mother says that at nine months old she was found one morning in bed, twitching, " like a fit that other children have in teething." No fever. One month later she started bumping into things. Previous to this she had crawled about on the floor quite well without bumping into things. Her sight seemed bad for two or three months, then gradually improved. The left eye was found turned in from the time of the fit. No other fits since.

When seen, with the exception of the squint, the eye appeared normal and the pupils reacted readily to light.

March 16, 1921. Now eight years old, eyes straight, had the squint operated on at St. Bartholomew's Hospital, 1920.

V.R. with −1 cyl. 40 degrees 6/12. V.L. with −3 cyl. 30 degrees 6/36. Fundi normal.

Case 9. Female child, aged eighteen months, brought up to hospital because she could not see. Five in family, no miscarriages.

September 9, 1913. " The child was well until a month ago, then had ' screaming convulsions.' When given the bottle the child felt for it and did not see it. Crawled round cot and hit her head. Was taken to see Mr. Fisher, who observed that the pupils were larger than normal, and reacted feebly to light, and that the child certainly did not see well."

September 16, 1913. A week later child now sees quite well. Pupils normal and react well.

April 8, 1920. Postcard returned from the dead letter office.

Cases 10, 38 *and* 44. These cases may reasonably be included under this heading. Here the onset of the meningeal lesion was so early in the child's life that it is hardly possible to assume normal visual acuity (for the age it would be merely the fixation reflex). In these cases the earlier onset and the more prolonged duration of the disease has produced serious disturbance to the visual pathways, and the amount of vision present is doubtful, though there appears to be some appreciation of light.

Case 10. Male child (fourth in family, no miscarriages, premature eight months), aged fourteen months. Brought to hospital because he could not see. " At two months had convulsions on and off for four consecutive days, none since. Quite healthy child. Regular movements of eyes. Cannot see except possibly bare perception of light. The blindness came on about fourteen days after the fits. Pupils under atropin. Fundi and media normal. Rubs eyes."

April 15, 1920. Received answer to inquiry saying that patient died at two years of age.

Case 38. Male child (firstborn) premature three weeks. " On the fourth day the infant became ill, the doctor who attended called the illness meningitis on account of the ' fits and cry.' The fits continued until the infant was three months old."

March 12, 1921. The infant is fairly well nourished and moves his limbs well. The eyes are usually held stationary, but sometimes converge and diverge, and occasionally show rapid horizontal movements. It was doubtful whether he sought the light. The pupils reacted to light. The fundus showed deficient choriocapillaris and pigment except at the macula which had a good red colour. There was a speckled sheen (internal limiting membrane) at and around the macula.

Last seen September 7, 1921. Definite pupil reflex to light. Doubtful if the child fixed the light. He seems definitely to gaze

at objects, but does not respond to any attempts to fix his gaze. Child is backward.

Case 44. June 15, 1921. Male infant fifteen months (first; no miscarriage) brought to the hospital because he did not take notice of things. No fits. Hydrocephalus noticed from eighth week, and is being treated for this at Queen's Hospital. Eyes held parallel and stationary, no paralysis. Pupils react to light, did not follow objects with eyes, but tried to avoid the light of the ophthalmoscope. Fundi showed a pigment deficiency, generalized, and there was pallor of both discs.

Last seen November 30, 1921. Tendency for left eye to diverge. Mother thinks the child's sight is improving. He does not fix the light, but yet seems to be aware of the light.

Mental Deficiency

Included in this group are all cases which showed any evidence of backward development. Some of the cases were observed for a short time only and then were lost sight of, so that it was not possible to know whether definite mental deficiency was established. Therefore such signs as delay in holding up the head, delay in development of speech, etc., were taken as probable evidence of future mental deficiency.

Nineteen cases were observed. The majority of the cases in this group were firstborn children.

Three cases were premature.

Congenital syphilis was established in three cases.

Fixation was poor in all the cases, and in none did any marked improvement appear during the period of observation.

Albinism was present in nine cases.

A history of fits was obtained in ten cases.

Convergent squint was noted in eight cases.

Divergent squint was noted in two cases.

Horizontal nystagmus was noted in five cases.

Roaming movements were noted in two cases

Eye rubbing was seen in six cases, and in five of these there was a refractive error, and in one a congenital cataract.

Head nodding appeared in three cases, and in two of these head banging was associated.

Pallor of the discs was observed in five cases.

Disseminated choroiditis observed in one case.

Paralysis of both external recti observed in one case.

In every case the pupil reactions were noted as being obtained.

Of these nineteen cases seven have been observed for over two years, and have become definitely mentally defective. Most of these infants appear to notice objects in a vague way. It requires a very strong light stimulus to evoke a response, and often it is very

hard to say definitely whether the light is noticed or not. The pupil reflex to light was obtained in every case, and certainly the impression which is produced by these infants upon the observer is that it is a lack of attention which is the underlying fault rather than a failure of the visual apparatus.

The two following cases are good examples of this group.

Case 2. John F., aged six months when first seen, October 30, 1913. His mother thought that he was blind. Three confinements, no miscarriages, two live children (one died of scalds). This child, the third, normal labour, jaundiced at birth. Internal strabismus, lateral nystagmus, pupils react to light, fundi normal.

October, 1915. Now two and a half years old, does not talk or walk, does not recognise people.

April, 15, 1920. Has been for the last four years an inmate of the Temporary Fountain Mental Hospital.

Case 53. Elizabeth B., aged 8 months, first seen August 8, 1921. Mother thinks that she does not notice things. Confinements one, miscarriages none, living child one, Wassermann reaction positive, fits for first six months, ten to fifteen a day, cries a lot, fair development, eyes straight, no nystagmus, pupils react to light. Fundi show a slight pigment deficiency, but macula has good red colour and discs are not pale.

November 14, 1921. Mother says "the child does not seem like other children of the same age, does not grasp things up in front of her, is backward, cannot sit up by herself, no teeth yet, does not crawl."

December 12, 1921. Will fix and follow light, but seems slow in making up her mind to do so, has not yet sat up or crawled.

Fits

In fourteen cases a history of fits was obtained. On reviewing these fourteen cases it appeared that the fits could be divided roughly into two types :—

(1.) Those which came on soon after birth, which lasted some months and were characterized by their frequency.

Case 4 as example :—

" Female infant thought to have defective vision. (Youngest sister was similar to this child, could not walk, had fits in infancy, no use of hands or legs, but sight was good; died age 6 years.) Patient was 7 months' child, had fourteen fits a day till 2 years old. Spastic contraction of lower limbs.

Right disc pale. Left disc temporal pallor.

When last seen obvious idiot, spastic legs, eyes divergent, pupils active to light, eyes always moving. Discs appear pale but difficult to see on account of movements."

(2.) Those which occurred at seven to nine months; generally only lasting a few days.

Case 8 as example:—

"Female infant. Mother says at nine months was found one morning in bed, twitching. One month later she started bumping into things, and did not take notice of things. Previous to this she had crawled about on the floor without bumping into things. Her sight seemed bad for two or three months and then gradually improved.

Vision when last seen—R. with -1 cyl. 40 degrees ↓ = 6/12. L. with -3 cyl. 30 degrees ↓ = 6/36."

The subjects of the first type of fit, in most cases, became mentally deficient and never developed average vision. The second type of fits was probably associated with a basal meningitis. These latter cases showed a true temporary or fleeting amaurosis.

In every case of these fourteen the pupil reaction to light was obtained.

Five cases were firstborn.

Twelve cases were mentally deficient.

One case was the subject of congenital syphilis.

Three cases showed albinism.

One case: consanguinity.

One case: premature birth.

One case: convergent squint.

Two cases: divergent squint.

Two cases: nystagmus.

Three cases: eye rubbing.

One case: head nodding.

One case: pallor of discs.

Two cases: disseminated choroiditis.

Delayed Fixation

In the normal infant the light fixation reflex should be present at, or on the first day or two after, birth. In other words the infant should fix a light which is directed towards his eyes. This fixation is only maintained momentarily; maintained fixation does not usually appear until after the first month. In some cases there appears to be delay in the development of this function. In this series of cases this phenomenon was present in nine cases. Subsequently in all the nine cases fixation appeared, and the infant was able to pick up objects.

Case 28 may be considered typical of this condition.

Female infant, aged three months (seventh, three miscarriages), "brought to the hospital because she could not see, healthy child, no fits, negative Wassermann reaction, slight nystagmus (horizontal), pupils normal. Fundi: Large gaps of white choroid,

absence of capillary layer of choroid except at macula, discs appear pale with sharp edges, physiological cup small and not filled in, lamina cribrosa not seen, does not rub eyes."

November, 1920. "Now plays with paper."

February, 1921. "Aged nine months, eyes parallel, slight horizontal nystagmus, looks at one drunkenly with some slight horizontal nodding of the head. Notices things only slightly, occasionally closes eyes when the face is threatened with a blow. Pupils active."

May, 1921. "Aged one year, seems to see and look at objects the size of half-a-crown, looks at mirror of ophthalmoscope but does not fix well, slow horizontal nystagmus and head nodding (horizontal); on the whole notices things better."

November, 1921. "Aged one and a half years, head nodding has ceased, sees much better, picked up a halfpenny on the floor, can stand, not backward, mother says she noticed that sight began to develop at seven months, says a cousin of this infant was blind until nine months of age, but now sees well; asked to bring the said cousin next time."

"Pigment deficiency of fundus except in macular area."

In seven of these cases there was a definite pigment deficiency. This is a significant fact. The family position of the infants was of no special significance. In no case was there evidence of congenital syphilis. The pupil reactions were noted as normal in eight cases (the ninth case was one of aniridia). In two cases the infant was definitely backward.

There was an hypermetropic error in four cases and correcting lenses produced improvement in vision.

Convergent squint was seen in four cases.

Divergent squint was seen in one case.

Horizontal nystagmus was present in four cases.

Head nodding was present in three cases.

Roaming movements were present in one case.

Eye rubbing was present in four cases.

Head nodding disappeared as vision improved.

Fits were noted in one case up to seven months. This child was also backward, but when last seen his vision had definitely improved.

In one case there was total absence of the iris. This case, when last seen, had good vision.

In one case there were vitreous opacities in each eye, and in the left eye some pigmentary disturbance in the macular region, indistinctly seen. The Wassermann reaction of the mother and child was negative, but the condition was improving on grey powders, and the infant now certainly sees.

Albinism

In seventeen cases this condition was present. By albinism is meant a condition of the retina and choroid in which there is deficient development of the pigment epithelial layer of the retina and the chorio-capillaris, so that the larger choroidal vessels are seen shown up on the white background of the sclera. In certain of these cases the macular area itself showed a good red coloration. In these cases it was often extremely difficult to decide upon the condition of the disc. The normal colour comparisons are absent and the discs of the cases always give the impression of pallor. The condition of the physiological cup, and the visibility or otherwise of the lamina cribrosa had to be taken into consideration.

Of these seventeen cases:—

Nystagmus was present in all save three, two of whom gave a history of fits and were definitely backward, and one was suffering from hydrocephalus and was under treatment at the Children's Hospital. These three children showed no, or very defective, fixation all the time they were under observation. Fixation certainly did not fully develop in them as it did in the others.

The nystagmus is noted as horizontal in nine cases and roaming in two cases.

Convergent squint was found in eight cases and divergent squint in two cases.

Position in the family of no special significance.

Eye rubbing in six cases.

Head nodding in three cases.

Consanguinity in one case.

Prematurity in one case.

It may be well to define more exactly what is meant by albinism in this connection.

Albinism is a term denoting deficiency of pigmentation. This deficiency may be widespread, or confined to one organ of the body. Nettleship (*Trans. Ophthal. Soc.*, 1906, XXVI, 244) in a paper on "Some varieties of Albinism," describes the following clinical varieties of this condition.

(1.) Skin and eye (general albinism).
(2.) Present in the eye but not in the skin.
(3.) Affecting the retina and choroid alone.

The cases referred to under the heading albinism belong to the third grouping in which the retina and choroid alone are affected.

Congenital Cataract

In the series there were seven cases of congenital cataract. The type of opacity was noted in detail in four cases (32, 40, 43, 57). One case had been needled previously; this particular child did not fix the light and the pupils did not react to light. The infant

was backward in every respect and has since died. One other case of the seven has died since first coming under observation. This case died from broncho-pneumonia, and was indeed suffering from this disease when seen here, so that no very satisfactory observations were made. With regard to *position in the family*: two first, one second, two third, two fourth. One of the firstborn infants was a seven months' baby. The Wassermann reaction was positive in one case; this child was the first born following on three miscarriages. In the other cases there was no evidence of syphilis. Two cases fixed the light well, three cases indifferently, and to strong stimulus only. The pupil reaction was present in these five cases, and absent in the other two cases, who, it should be observed, were ill at the time of examination, and have since died.

One case was noted to rub his eyes; this case fixed the light readily.

Nystagmus was noted in all the cases except in the case of the infant who was ill with broncho-pneumonia at the time of the examination. The nystagmus was of the roaming type with occasional series of rapid lateral jerks. Convergent squint was noted in two cases.

Case 40. Central circular opacity anteriorly, with deeper opacities more posteriorly.

Case 43. Opacities of " dot " type, widespread, with tendency to coalesce and to become almost " lattice like " in appearance.

Case 57. Dense central lens opacity with clear periphery; some anterior capsular opacity.

Case 32. R.E. central irregular disc-shape cataract with irregular edge, not of uniform density. Red reflex peripherally.

L.E. cataract; whole vertical and lateral diameter opaque. No red reflex.

Congenital Syphilis

Cases classified under this heading were those which gave a positive Wassermann reaction, or those in which the Wassermann reaction being either negative or not taken, there were physical signs of congenital syphilis, or other significant data, such as maternal miscarriages.

Under these conditions seven cases were found in the series. In four of these choroido-retinitis was present, and, in addition, in one of these four there were considerable opacities in the vitreous.

Fits were noted as having occurred in three cases.

Three of the cases were mentally deficient.

Two cases have died since first coming under observation, one from diarrhoea and sickness; the cause of death of the other was not ascertained.

Pallor of the discs was noted in two cases.
Cataract was noted in one case.
Consanguinity was noted in one case.
Prematurity (seven months) was noted in one case.

Consanguinity

Nettleship, in his paper on " Amaurosis in Children " (*Trans. Ophthal. Soc., U.K.*, 1884, IV, 243) mentions kinship of the parents as a factor of ill portent when considering prognosis in these cases. Three cases were seen in this series in which the parents were related.

Case 3. Parents are first cousins.

" Three confinements, one miscarriage (second). First child healthy. Patient is the second child. Had bronchitis when two months old, when defective vision was noticed. Fits from two months onwards. Father, mother and child gave positive Wassermann reaction. Optic atrophy, right and left eyes. Is now blind."

Case 15. " Parents first cousins, patient one of twins. Divergent strabismus, horizontal nystagmus. Vision: counts fingers, right and left eyes. Pupils react to light. Is now sixteen years old. Fits occurred when between seven and nine years of age. Discs very difficult to see aright owing to nystagmus, but appear pale. His twin brother started fits at the age of twelve, but his vision is good."

Case 20. Father and mother are first cousins once removed. Patient is an albino.

Difficult Labour

In this grouping are collected those cases in which a history of difficulty at the birth was obtained. As the information, in many of the cases, came from the mother or husband, it must necessarily be a matter of uncertainty as to what extent the confinement can be regarded as abnormal.

Ten cases are here recorded. In three cases it is merely noted that the labour was protracted. In two cases there was difficulty in inciting respiration in the infant. In three cases instruments were used. One case was a twin, the other twin dying on the third day. In one case there was a face presentation with an extended head; in this case, following upon delivery, there appeared a left-sided facial paralysis which lasted three weeks, but was completely recovered from.

Of these ten cases the family position was as follows:—

First, five cases; second, one case; third, one case; fifth, one case; sixth, two cases.

The following particulars concerning these ten cases are derived from their notes:—

Mental deficiency or backward, two cases.
Fits, two cases.
Pallor of disc, two cases.
Albinism, four cases.
Horizontal nystagmus, four cases.
Roaming movements, one case.
Congenital cataract, one case.
Visual result: Good, five cases; fair, two cases; bad, three cases.

Premature Birth

There were five cases of premature birth, three of these were seven months' babies and two eight months' babies. All five cases were either mentally deficient or backward and one of these infants has since died. There was a history of:—

Fits, four cases.
Congenital cataract, one case.
Syphilis, one case.
Pallor of discs, one case.
Albinism, two cases.
Horizontal nystagmus, one case.
Roaming movements, one case.
Convergent strabismus, one case.
Divergent strabismus, one case.
Visual result: Good, one case; fair, one case; bad, three cases.

Position in the Family

It cannot be said that, in this series of cases, any special significance was found with regard to the position in the family. Certainly, the majority of the infants were firstborn infants, but that majority was not so large as to be beyond the normal. The figures are as follows:—

First, twenty-one cases; second, four; third, ten; fourth, five; fifth, five; sixth, four; seventh, four; eighth, nil; ninth, two; tenth, one.

Reaction of the Pupils to Light

In seven cases only was there no reaction of the pupils to light. Of these seven cases:—

Congenital defects in the development of the iris, two cases (cases 22 and 59); pallor of the discs, three; post-neuritic atrophy of the disc, one; congenital cataract, one (this case died soon after coming under observation); congenital syphilis, one; albinism, one.

In fact, excluding the two cases of congenital malformation of

the iris, four cases showed disease of the optic nerve, and in all probability the other case (congenital cataract) was similarly affected.

Eye Rubbing

It is held that this sign is an indication that the light percipient elements of the eyes are in good condition, but that clear or distinct vision is not being obtained. One would, therefore, expect that such conditions as high errors of refraction, opacities in the media, pigment deficiency and, possibly, localized macular disease, would be conditions associated with the sign.

In the present series of cases, this assumption is borne out. The sign was observed in two cases.

Hypermetropia was present in six cases.

Albinism was present in four cases.

Congenital cataract was present in one case.

Temporary amaurosis with fits was present in two cases.

Choroiditis was present in one case.

Four cases were mentally deficient.

Head nodding was associated in three cases.

Horizontal nystagmus was seen in four cases.

Roaming movements were seen in four cases.

Convergent non-paralytic strabismus occurred in four cases.

Head Nodding

This sign was observed in four cases. The movements in each were of a lateral rotatory order. In all these cases the head nodding had ceased when last seen and the vision had definitely developed, so that the infant was able to pick up small objects from the floor. In all four cases hypermetropia was present.

Horizontal nystagmus was found in one case.

Roaming movements were found in two cases.

Albinism was found in two cases.

Convergent strabismus was found in two cases.

In case 22 there was bilateral paralysis of the external recti, and head banging was associated with the nodding. When last seen the head nodding and banging had ceased, the child could see well, and picked up a pin from the floor. There was four dioptres of hypermetropia—the correcting glass had been given. There was at one time some doubt as to whether the child was not going to be mentally defective, but at the last visit (December 12, 1921) the child, now aged two years and five months, walked well and appeared quite intelligent, but was only just beginning to talk. In this connection—delayed articulation with no lack of intelligence—case 23 may be mentioned.

This case was one of temporary amaurosis.

Nystagmus

This feature was present in the majority of the cases. There was, however, much variety in the type of nystagmus present. It is possible to divide into two rough classes the different forms of nystagmus observed in this series of cases, namely :—

1. Horizontal movements.
2. Roaming movements.

In many cases, however, there was a combination of both types of movements. " Roaming movements with occasional rapid lateral jerks " were often seen.

No definite factor was found which could be said to be associated with any particular kind of movement.

As might be supposed, albinism, cataract and fundus disease were practically always associated with nystagmus.

In eight cases there was a definite refractive error, hypermetropia in seven, myopia in one.

Almost certainly this factor, refractive error, was present in many more of the cases of nystagmus of this series, but the difficulty in estimating the refractive error in these cases may be very great.

Squint

Convergent non-paralytic squint was present in twenty-two cases.

Of these twenty-two cases : hypermetropia nine, myopia two, albinism six, cataract two.

And associated with the squint, horizontal nystagmus eleven cases, roaming movements three, eye rubbing six, mental deficiency seven.

Divergent non-paralytic squint, five cases observed.

Of these five cases : history of fits three, mental deficiency three, albinism one, myopia one, consanguinity one, delayed fixation one.

In the last case good fixation subsequently appeared.

Analysis of Cases

Of these sixty cases it would appear that the primary cause of the amaurosis was as follows :—

Temporary amaurosis	5 cases.
Mental deficiency	19 ,,
Albinism	17 ,,
Cataract	7 ,,
Hypermetropia	5 ,,
Fundus disease	7 ,,

(Optic atrophy, choroido-retinitis, etc.)

It should be pointed out, however, that there was a certain amount of overlapping. For instance, mental deficiency was often associated with albinism.

Conclusions

(1.) That absence of the light fixation reflex in infants, with otherwise normal eyes, is often an early sign of future mental deficiency.

(2.) That delay in the appearance of the light fixation reflex is often associated with a pigment deficiency affecting the retina and choroid. That in these cases the light fixation is delayed only and will appear in due course.

(3.) That the pupil reaction to light was only absent in those cases in which there was a definite disease of the optic nerve. All the cases of temporary amaurosis and of mental deficiency in this series presented an intact pupillary reflex arc.

(4.) That congenital syphilis was established in only seven cases of this series.

(5.) That such features as consanguinity of the parents, difficult labour, and premature birth of the infant, did not figure to any great extent in these cases.

(6.) That the presence of eye rubbing usually denoted a local defect in the eyeball, such as cataract, refractive error or pigment deficiency.

SUB-CONJUNCTIVAL CATARACT EXTRACTION

BY

ANGUS MACGILLIVRAY, C.M., M.D., D.Sc.

DUNDEE

A PRELIMINARY communication on *sub-conjunctival cataract extraction* was made to the Forfarshire Medical Association in March, 1914, and published in the *Edinburgh Medical Journal* of May, 1914. In that communication we drew attention to what must always be regarded as a non-surgical procedure in the technique of senile cataract extraction, namely, leaving a comparatively large wound in the sclero-corneal region open and unprotected. Suturing the lips of the wound has from time to time been recommended, but, obviously, it is a somewhat complicated and difficult procedure, and, considering the delicate

structures involved, is, in the opinion of most operators, undesirable. It is true that in a well-performed cataract extraction the lips of the wound usually lie in good apposition at completion of the operation; but, owing to restlessness on the part of some patients, the lips of the wound are liable to become displaced, and so the healing process may be retarded or the safety of the eyeball imperilled. A fit of coughing, sudden movement, or such like eventuality may supervene, and mar the most skilfully performed operation. To minimize such occurrences sub-conjunctival extraction has been practised in special cases by a few operators at different times, but so far this method has not become a regular surgical procedure in the extraction of senile cataract.

A form of sub-conjunctival extraction was advocated by Alexander as far back as 1825, by Desmarres in 1851, by von Hasner in 1873, and by Pansier and Vacher in 1899. In 1903 Czermak recommended sub-conjunctival extraction for cases in which there is danger of loss of vitreous, either during the operation, owing to dementia, excitement, dislocation of the lens into the anterior chamber, over ripeness, and the like; or, after operation, from gaping of the wound through great restlessness, violent paroxysms of coughing, etc.

"The procedure for sub-conjunctival extraction," as recorded in Haab's Atlas[1], "consists in making a broad conjunctival flap with the base above, which is not divided posteriorly, so that the edge of the corneal wound is connected with the equatorial conjunctiva by a broad bridge of conjunctival tissue. This makes it impossible for the wound to gape; at the same time, however, it is more difficult to express the cataract under the conjunctival bridge. The latter should be made before the anterior chamber is incised, but, owing to the greater difficulty of extracting the cataract through an upper incision, iridectomy is absolutely indispensable."

Czermak's sub-conjunctival extraction[2], which is different from that described by Haab, consists in making a conjunctival pouch below the cornea, open on the temporal side only. Into this pouch the lens is expressed during the process of extraction. He uses a large Graefe knife, with which he enters the anterior chamber at the temporal end of the horizontal meridian of the cornea, the puncture being made through the conjunctiva well behind the limbus. The point of the knife is then directed towards the centre of the pupil, and, acting as a cystotome, divides the anterior lens capsule. The knife is withdrawn, and another incision is made through the conjunctiva downwards for about fifteen millimetres. The lower part of the conjunctiva is undermined from the lower end of the vertical conjunctival incision inwards and upwards along the limbus to a little beyond the inner

end of the horizontal meridian of the cornea, care being taken not to cut through the conjunctival pouch thus formed. By means of a pair of blunt-pointed scissors, the posterior blade being introduced into the anterior chamber, and the anterior blade underneath the conjunctival bridge, the cornea is divided around the margin to the inner end of the horizontal meridian. By pressure over the ciliary region above, and by simultaneous pressure backwards on the posterior lip of the wound, the lens is expressed into the conjunctival pouch below, whence it is easily removed by a curette. The wound in the conjunctiva is closed by a couple of sutures inserted horizontally. Eserin is instilled, a protective bandage applied, and the patient kept as quiet as possible for some time after the operation.

Czermak's operation was modified and somewhat simplified in 1907 by Dimmer[3], who incises the conjunctiva for a distance of eight millimetres at a point downwards and outwards eight millimetres from and parallel to the limbus. The bulbar conjunctiva is then freely undermined half-way round the cornea up to the limbus. The subsequent corneal incision is divided into three stages. The middle third is done by means of a keratome, and this incision is extended on each side by scissors till one-half of the corneal circumference is divided. The capsule of the lens is then opened by a cystotome, and the lens expelled as in Czermak's operation. Thereafter the conjunctival wound is closed by a single suture.

Cluckie of Greenock[4], in 1909, described a method of sub-conjunctival extraction similar to that described by Haab. The operation proceeds as in an ordinary cataract extraction to the point where there is left a connecting bridge between the cornea and conjunctiva about four millimetres broad. Instead of completing the section in the usual manner, leaving a small conjunctival flap adhering to the anterior lip of the corneal wound, the Graefe knife is carried upwards and backwards under the bulbar conjunctiva for some twelve millimetres, and is then withdrawn without cutting through the conjunctiva. By this procedure a corneo-conjunctival bridge covers the deep wound, which enhances the chances of success and ensures a speedy recovery. Iridectomy, if desired, may be done, preferably upwards and inwards. The capsule may be ruptured before or after the iridectomy from the temporal side and the lens thereafter extracted.

Bajardi[5], in 1910, described a method of sub-conjunctival extraction essentially similar to that described by Cluckie. The conjunctival flap is cut from twelve to fifteen millimetres broad by means of the Graefe knife; iridectomy and capsulotomy are then performed, and the lens is extracted by a Daviel spoon applied to the posterior lip of the wound beneath the conjunctival bridge, and

by simultaneous pressure from below by means of another spoon placed over the ciliary region.

During 1912 to the middle of 1914 we performed sub-conjunctival extractions in special cases as occasion arose somewhat after the manner first described by Haab, and subsequently by Cluckie and Bajardi, with most satisfactory results. To begin with, the cases on which we performed sub-conjunctival extraction were those in which prolapse of the vitreous from a weakened suspensory ligament was anticipated, those not likely to submit to the necessary post-operative discipline, those suffering from chronic cough, and especially those in whom the environment of the wound from an aseptic standpoint left much to be desired.

At the outset we did not regard the technique of the operation as easy, especially in the case of patients with small palpebral apertures, and in those that could not be depended upon to keep steady during the operation and rotate the eyeball downwards in the required direction. This is probably the reason why sub-conjunctival extraction has never become popular with operators. After a little practice, however, the technique becomes quite simple; and, when the operation is successfully performed, its advantages are so obvious as to be instantly appreciated.

In our early cases of sub-conjunctival extraction we invariably performed iridectomy after completing the sclero-corneal section and conjunctival bridge; but, finding removal of the piece of iris at, or near, 12 o'clock difficult owing to the broad conjunctival flap, we soon discarded iridectomy altogether in favour of simple extraction, i.e., without iridectomy. This procedure we found to be thoroughly justified as the risk of iris prolapse with the wound protected by the conjunctival flap was practically negligible, provided certain precautions were rigidly adhered to.

Being engaged on military service throughout the greater part of the War, our opportunities for cataract extractions in private and hospital practice were very considerably curtailed; but, after demobilization in February, 1919, when regular practice was resumed, we have done all our cataract extractions—some three hundred to date—by the sub-conjunctival method without iridectomy, except in a very few cases, where, for one reason or another, preliminary iridectomy was performed some six weeks before extraction.

When the lens is ripe, or sufficiently ripe, for extraction, and, being satisfied that there is no dacryocystitis, inflammatory condition of the conjunctiva or lid margins, and that the general health is satisfactory, we give the patient astringent drops consisting of zinc sulphate, alum and boric acid (2, 1 and 4 grains respectively to the ounce), or fresh undiluted collosol argentum, three drops to be instilled into both eyes three times a day for three

weeks before the patient is admitted to hospital. On admission the same drops are continued till the morning of the operation, when the eyelashes are cut short, and the face thoroughly washed. We prefer the patient to be in hospital for forty-eight hours before operation so as to become accustomed to his new environment. A careful examination is made by the house surgeon of all the systems, and the result duly reported to the operator. Should this report be satisfactory, a mild aperient is given the evening before operation, followed by an enema in the morning, to ensure that the bowels are emptied in the early morning. For some years past we have operated on the patient in bed in the ward with great advantages in every way, the object being to disturb the patient as little as possible both mentally and physically before, during and after operation. When the head of the bed is inconveniently high for the operator, the patient's head is placed at the other end, and the bed put in the best position possible for light a short time before preparations for the operation are begun. Whenever the patient shows any signs of nervousness, the house-surgeon is instructed to give a hypodermic injection of ¼ 0.25 cc. of trivalin-hyoscin (*The Saccharin Corporation, Ltd.*)—half-an-hour before operation, as recommended by Elliot[6] in glaucoma operations. This has been found most satisfactory by patient and operator alike. Some twenty minutes before operation a few drops of a freshly prepared 5 per cent. sterilized cocain solution are instilled into both eyes, followed immediately by a few drops of 1 per cent. pilocarpin solution to the cataract eye only to prevent cocain mydriasis, and repeated every three minutes, the eyelids being kept closed in the interval to guard against corneal desiccation.

When the morning of operation is dull, artificial light is substituted for daylight by means of an adjustable electric standard lamp with parabolic reflector. The pillow on which the head rests is completely covered over with sterilized jaconet and not removed after operation for a few days, and the patient's hair concealed by an india-rubber bathing cap.[7] Under the head rests transversely some thirty inches of narrow tape with which is secured the large double shade applied after operation. Over the upper part of the bedclothes, and tucked well under the shoulders, is laid a large sterilized jaconet, to ensure as thorough an aseptic environment of the field of operation as possible. This is how the surgeon finds his patient on entering the extemporized operating theatre.

Gloves are not worn, the surgeon trusting to produce sterilization of his hands by scrubbing with nail-brush and soap under a running tap of warm water to remove all grease and then the immersion of his hands for a couple of minutes in a solution consisting of 1 in 1,000 perchloride of mercury and 1 in 80 carbolic.

A further precaution is meticulously adhered to—never to touch the wound, or the part of the instrument that comes in contact with the wound, not even with disinfected fingers, for in all operations the fewer hands and instruments the better.

Preparation of Instruments.—If the surgeon wishes a keen edged knife and strict asepis, he should have his own instruments and keep them under lock and key. He should also personally see to their disinfection and storage, and keep all edged instruments well smeared with sterilized vaseline when not in use. The knife with which we did our latest cataract extraction in the Dundee Royal Infirmary has done 45 extractions without sharpening, and is still serviceable, very probably because of the reason above mentioned, and the fact that the knife and cystotome are not boiled along with the other instruments in the sterilizer, but are disinfected, after the vaseline has been removed by a soft linen handkerchief, by immersion in pure ether and transference to absolute alcohol. When the other instruments, arranged in order on the sterilizer tray, have been in ordinary boiling water (preferably distilled) for three minutes at least, the knife and cystotome are placed on the tray alongside the others by the surgeon, and dipped in the sterilizer to remove all traces of the above disinfectants. The tray containing the instruments is then removed by the sister, and placed on a convenient stand to the right of the patient's head, no fingers being allowed to touch the instruments till required by the surgeon.

Final Preparations of the Eye.—After a kindly greeting to the patient, and a reassurance of no pain from beginning to end of the operation, the surgeon proceeds to make final preparations. The patient is asked to close his eyelids as if he were asleep, and, after the edges of the eyelids are made to pout by gentle pressure, the surgeon cleanses the lid margins, and openings of the Meibomian glands and puncta by means of a cotton wool mop and warm sterilized saturated boracic solution. A Clark's speculum is then applied, and the upper and lower *culs de sac* are thoroughly flushed with tepid sterilized boracic solution by means of a sterilized all-rubber ball syringe of, say, two ounces capacity, the speculum being lifted well forward during the procedure to put the conjunctival folds in the *cul de sac* on the stretch. Finally, the whole of the conjunctival surface is freely irrigated with sterilized tepid isotonic salt solution from an undine[8] to remove the boracic solution. At this juncture the patient may be told, what is literally the truth, that the only disagreeable part of the operation is over, and that the remaining part is quite simple, provided the eyes be kept looking steadily downwards, and no attempt be made to close the eyelids.

Description of the Operation.—The conjunctiva is firmly secured

by means of a fixation forceps applied just below six o'clock, when the patient is enjoined to look downwards as far as he conveniently can, and to keep looking steadily in that direction without fail till the operation is completed. The point of the cataract knife[9] is inserted from the temporal side into the anterior chamber at a point 1 mm. behind the limbus, and about 1 mm. above the horizontal diameter. It is then passed horizontally through the anterior chamber and brought out at a corresponding point opposite. After the counter-puncture is completed, the scleral incision is carried upwards and completed in the ordinary way, but without dividing the conjunctival bridge. At this stage the edge of the knife is directed backwards, and by one or two sawing movements a conjunctival bridge is carried upwards from the limbus for a distance of not less than 12 mm., the bridge being made as broad as possible—the broader the better. The tendency to begin with is to make a narrow conjunctival bridge, but, with a little practice, one can generally get a bridge 10 mm. broad without difficulty. The anterior capsule of the lens is now freely divided with the cystotome in the pupillary area, or the central portion may be removed by capsule forceps. By depressing the posterior lip of the wound under the conjunctival bridge with a curette made specially broad and deep, and by applying steady pressure over the ciliary region from below upwards, the lens, as a rule, passes without difficulty through the pupil into the anterior chamber, thence upwards through the scleral wound under the conjunctival bridge, and then on to the conjunctival surface. During the process of expulsion care must be taken that the necessary pressure required with the spoon below be steady and continuous throughout, just as in the open method. After the expulsion of the lens the sub-conjunctival wound becomes instantaneously closed by the pressure over it of the conjunctival bridge, the deep wound becoming actually concealed. The toilet is completed sub-conjunctivally, and any cortical débris, left behind in the aqueous chamber and under the conjunctival bridge, removed by the same large curette and undine containing sterilized tepid isotonic salt solution without any difficulty and without any special instruments or apparatus. If necessary, the iris can be stroked back into position with the curette by simply passing a curette, held horizontally, through underneath the bridge, into the anterior chamber as far as both extremities of the wound. The iris can generally be replaced by one or two gentle strokes of the curette. After this the pupil should remain central and circular about 4 mm. in diameter. The operation being now completed, a few drops of sterilized pilocarpin solution 1 per cent. are dropped into the lower *cul de sac* from a drop bottle[10], the speculum is removed and the eyelids are closed. Granted an ordinary-sized palpebral aperture, and a

steady patient, the whole procedure, from the moment of fixation of the eyeball till the lids are finally closed, can easily be accomplished in the space of thirty seconds, provided there be no hitch and no cortical débris. When cortical débris is left behind in the aqueous chamber after expulsion of the lens, it can generally be removed in a few seconds without any additional instruments or apparatus by using the large curette and undine containing sterilized tepid isotonic salt solution. A single plaster dressing (oval shaped, 2 by 1½ inches), consisting of two layers of sterilized lint, taken out of sterilized boric solution, is applied, over which is placed a layer of dry sterilized absorbent cotton wool overlapping the lint below by ¼ inch all round. The dressing is kept in position by a vertical and horizontal strip of ½ inch adhesive rubber plaster, the fellow eye being left with the eyelids closed but uncovered. A large double shade, made of two folds of brown paper, reaching from ear to ear and down over the nose, is applied and kept in position without moving the patient's head by the tape lying underneath the head. The bed, with patient, is now lifted carefully back into its former position in the ward, under the immediate direction of the surgeon. This can be done without any movement on the part of, or inconvenience whatsoever to, the patient. After a few optimistic remarks he is handed over to the resident staff, with instructions to keep him absolutely quiet, but as bright and happy as possible. The eye is examined in the evening by the sister-in-charge before going off duty, and, after instilling a few drops of pilocarpin, a fresh single plaster dressing is applied. Atropin is, as a rule, not instilled till forty-eight hours after operation. Then the pupil is kept just moderately dilated. The conjunctival wound heals very rapidly, and the deep wound follows suit without, as a rule, any interruption. The patient is allowed reasonable freedom on the fourth morning, and discharged three weeks after operation, with instructions to return in four weeks for spectacles or dilaceration, as the case may be.

1. *Difficulties arising during operation.*—If a fold of iris be caught in front of the knife, as occasionally happens in all cataract operations during section, an attempt is made to evade it; but, should this fail, we carry out the incision as if no obstruction presented itself, the worst that has happened in our experience being an accidental peripheral iridectomy, which in no way militates against the real success of the operation, except from a cosmetic point of view.

2. *A narrow palpebral aperture.*—In such cases the conjunctival bridge is carried upwards as far as the edge of the eyelid will permit, then the point of the knife is gradually withdrawn from the nasal side, and the incision carried at an angle upwards and

outwards underneath the eyelid sufficiently far to allow of the easy expulsion of the lens.

3. Should the lens not present in the anterior chamber under the usual pressure, it can be removed with little or no loss of vitreous by placing the ring of the vectis over the upper pupillary margin, drawing the iris sufficiently upwards with the vectis to allow the latter to be inserted at the upper edge of the lens and thence behind it. The iris, immediately after the use of the vectis, is generally prolapsed under the conjunctival bridge, but it is easily replaced by one or two strokes of the large curette as already described.

4. *Accidental division of the conjunctival bridge.*—This happened to us just after completing the scleral section in the case of a very old patient, who, although quite steady, had a very friable conjunctiva. An iridectomy was performed as if nothing had happened, and the operation was classified as an ordinary combined open cataract extraction.

Preliminary iridectomy.—In the few cases in which we have performed sub-conjunctival extraction some weeks after preliminary iridectomy, we found the operation to be simplicity itself, for the risk of entanglement of the iris during section, or prolapse after operation, was practically negligible. The great objection, however, to preliminary iridectomy as a routine procedure is that it necessitates at least two operations, which we consider to be altogether unnecessary, seeing that entanglement and prolapse of the iris are comparatively rare complications in simple sub-conjunctival extraction. Preliminary iridectomy may be advantageous to commence with till one gets familiar with the technique of sub-conjunctival extraction, but we feel confident that, after a few trials, the simple sub-conjunctival operation will be tried and found eminently satisfactory. It should be remembered that in simple extraction without iridectomy one very important advantage has to be placed to its credit, namely, the impossibility of lens capsule becoming incarcerated in the wound—a fertile source of future trouble.

In conclusion, the advantages we claim for simple sub-conjunctival extraction are:—The ease and rapidity with which the operation can be performed, the better protection of the wound from bacterial invasion, the safety against iris prolapse under proper care and pilocarpin, the securing of complete apposition of the lips of the deep wound during the healing process by the gentle pressure of the conjunctival bridge, and the beautiful cosmetic and physiological effect of a normal-sized, circular and movable pupil.

Judging by the results we have obtained during the past few years, we certainly would not revert to the old open combined

operation; and we, therefore, have no hesitation in recommending, with the utmost confidence, simple sub-conjunctival extraction as being the simplest and safest operation for the relief of senile cataract we know of at present. It is the operation we would desire for ourselves should such be necessary.

REFERENCES

1. "Haab's Atlas of Operative Ophthalmology." Translated by de Schweinitz, p. 158, 1905.
2. **Wood, Casey A.**—"System of Ophthalmic Operations." Vol. II, p. 1221, 1911.
3. **Dimmer.**—"Eine Subkonjunktivale Methode der Staarextraktion." *Bericht der Ophthal. Gesell.*, p. 218, 1907.
4. **Cluckie.**—*The Ophthalmoscope*, Vol. VII, p. 743, 1909.
5. **Bajardi.**—"A System of Ophthalmic Operations," by Casey A. Wood, Vol. II, p. 1224, 1911.
6. **Elliot.**—"Glaucoma," p. 424, 1918.

INSTRUMENTS

7. Down's Catalogue, fig. 2072, 1914.
8. Down's Catalogue, fig. 2249 (a), 1914.
9. Down's Catalogue, fig. 2277 (a), 1914.
10. Down's Catalogue, fig. 2263 (a). 1914.

HOLTH'S EXTRALIMBAL TANGENTIAL PUNCH FORCEPS SCLERECTOMY FOR CHRONIC GLAUCOMA*

BY

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HOLTH'S new operation for glaucoma, extralimbal tangential sclerectomy, has been performed in 52 cases at the University Eye Clinic at Christiania. In connection with Dr. Holth's paper, I here give the experience we have had with regard to this operation and its results.

In forty of the fifty-two cases the operation was performed for *glaucoma simplex*, in twelve cases only for other forms of glaucoma, viz., in six cases of buphthalmus, four cases of secondary glaucoma, one case of acute inflammatory glaucoma (the prodromal stage) and one case of chronic inflammatory glaucoma.

The first six operations (incisions with the Graefe knife, a broad needle or with the keratome) were performed in June, 1920 by Holth himself, the remainder, up to the present time, partly by my predecessor Professor Hj. Schiötz, and partly by myself. There has not been any selection of cases for this operation; during the above period the operation has been employed in nearly all cases where previously we should have performed Elliot's trephining. There was no case of glaucoma absolutum among our cases.

*Read at the Fifth Scandinavian Ophthalmological Congress at Stockholm, August 29, 1921.

As regards *technique* we have mostly followed the procedure described by Holth in this journal, 1921, pp 547-549. I will merely observe, that in cases of a very shallow anterior chamber, we prefer to make the incision with the Graefe knife, because in such cases by this means the incision can be made more safely, without wounding the iris or the ciliary body. The incision should not be too short; when using a 1.5 mm. punch forceps the incision must be at least 4 mm.; if a 1 mm. punch forceps is used a 3 mm. long incision is sufficient. We have used the 1.5 mm. punch forceps as well as one of 1 mm. The defect obtained by the 1 mm. punch forceps in glaucoma simplex is, according to our experience, quite large enough, and is therefore to be preferred. For buphthalmus, on the contrary, I believe a 1.5 mm. punch forceps should be used, and excision be made *from both angles of the keratome incision* so that double sclerectomy is obtained. We generally make a small peripheral iridectomy corresponding to the sclerectomy opening. Occasionally we have also made a complete iridectomy, but whether the latter or the peripheral is chosen does not seem to make any difference to the result. In two cases we have omitted the iridectomy altogether without the result being any the worse for it, but it is advisable always to perform iridectomy, for otherwise there is a risk of closing the sclerectomy opening by an iris prolapse.

I will first detail the results of the operation for *glaucoma simplex*. As stated above, we have performed the operation on forty eyes, none of which had been operated upon before. There was glaucoma in all stages, but as mentioned before, no case of glaucoma absolutum.

Complications during the operation have occurred once only. This was in a case of advanced glaucoma with a very shallow anterior chamber. When the incision was made with a keratome, there was at once a somewhat profuse *haemorrhage* from the iris, possibly also from the ciliary body, which may have been injured by the point of the keratome; the blood lasted for a long time in the anterior chamber. Later on, occlusio pupillae followed, but at last the eye became quiet with a somewhat increased tension.

Amongst *complications after the operation* must be mentioned one case of *cataract* appearing in connection with the operation on an eye where no iridectomy was performed. A direct injury to the lens capsule is out of the question, most likely there had been a bursting of the lens capsule by the rapid emptying of the anterior chamber.

In three cases there appeared a protracted *haemorrhage* in the anterior chamber *after* the operation, but the final result was good.

The question of the frequency of iritis after sclerectomies is of great interest. As is well known, very frequently, after

Elliot's trephining, a slight or quiet iritis sets in. The more closely these cases are examined the more frequently some *posterior synechiae* are found. Holth's operation does not differ in this respect from Elliot's sclero-corneal trephining. After careful examination of our forty cases I have found ten cases only which were completely free from any trace of a posterior synechia; for diagnostic purpose I recommend an application of homatropin 1 per cent. It appears, however, that this slight or quiet iritis is of no great significance; but early applications of atropin 1 per cent. are advisable. In two cases there appeared a more pronounced *iridocyclitis*, with precipitates in one case, and occlusio pupillae in the other (the latter is the case before mentioned where a severe haemorrhage set in during the operation). Enucleation was not found necessary in any of the cases.

Complications, other than the above mentioned, did not appear unless the *transitory* post-operative *detachment of the choroid* is to be considered as a complication; this symptom is very frequently seen after trephining. Without any systematic examination such a transitory detachment was recorded in several of our cases where the anterior chamber remained shallow or effaced longer than usual.

I will now deal with the *tension regulating effects of the operation*. On leaving the hospital (generally a fortnight after the operation) the tension was good (viz., below 5.5/3 Schiötz) in all cases but one; this case showed a tension of 5.5/2, but the tension later on became normal.

In thirty-three cases the patients have been subjected to subsequent examination from five weeks to thirteen months after the operation. I have divided the cases into four groups according to the time of observation:—

I	11½ - 13 months	... ...	6 cases.
II	5 - 7 ,,	... ...	7 ,,
III	3 - 4½ ,,	... ...	11 ,,
IV	1¼ - 2½ ,,	... ...	9 ,,

GROUP I.

Time of observation 11½-13 months. (Punch forceps 1.5 mm.)

	TENSION.	SCAR.
1.	5.5/7	Smooth glassy cushion.
2.	5.5/7	Small flat glassy cushion.
3.	5.5/8	Flat cushion with bubble 2 mm. from limbus.
4.	5.5/20	Flat cushion with bubble 2.5 mm. from limbus.
5.	5.5/6.5	Somewhat prominent glassy cushion.
6.	5.5/4.5	Smooth, not glassy cushion.

GROUP II.

Time of observation 5-7 months. (Punch forceps 1 mm.)

	TENSION.	SCAR.
1.	5.5/5	Flat, not glassy cushion.
2.	5.5/5	Flat, not glassy cushion.
3.	5.5/11	Diffuse oedema of conjunctiva over and above the scar.
4.	5.5/5	Diffuse oedema of conjunctiva over and above the scar.
5.	5.5/3.5	Smooth scar.
6.	5.5/3	Smooth scar.
7.	5.5/7	Smooth scar.

GROUP III.

Time of observation 3-4½ months.

	TENSION.	SCAR.	PUNCH FORCEPS.
1.	5.5/7	Glassy, somewhat prominent cushion	1 mm.
2.	5.5/5	Smooth, glassy cushion	1 ,,
3.	5.5/7	Smooth glassy cushion	1 ,,
4.	5.5/8	Flat, not glassy cushion	1 ,,
5.	5.5/5	Flat, not glassy cushion	1 ,,
6.	5.5/5	Smooth scar ...	1 ,,
7.	5.5/7	Smooth glassy cushion	1.5,,
8.	5.5/20	Diffuse oedema over and above the scar	1.5,,
9.	5.5/6	Smooth scar ...	1.5,,
10.	5.5/5	Smooth scar ...	1.5,,
11.	5.5/5	Small flat, not glassy cushion ...	1.5,,

GROUP IV.

Time of observation 1¼-2½ months.

(Punch forceps 1.5 mm. in all cases, the last one excepted.)

	TENSION.	SCAR.
1.	5.5/4	Flat glassy cushion.
2.	5.5/10	Flat glassy cushion.
3.	5.5/5	Flat glassy cushion.
4.	5.5/10	Smooth, not glassy cushion.
5.	5.5/13.5	Smooth scar.
6.	5.5/3	Smooth scar.
7.	5.5/1	Smooth scar (iridocyclitis).
8.	5.5/2	Smooth scar (haemorrhage and iritis).
9.	5.5/5	Smooth scar.

All cases of the first three groups (viz., time of observation from three to thirteen months) showed *at the last examination a good tension without myotics*. In one case only there was found a tension of 5.5/3; the rest showed a lower tension.

In Group IV (time of observation 1¼-2½ months) there are two cases with a somewhat increased tension. These are precisely the two cases where iridocyclitis set in after operation.

At the last examination the *function* of the eye operated upon, both with regard to vision and visual field, was found on the whole unchanged. An exception is the case above mentioned where there developed a cataract after the operation.

Thus the last examination shows a *very favourable result* with regard to functional and tension-regulating effect in *glaucoma simplex*. I am, of course, aware that the number of cases is too small and, above all, the time of observation too short to justify definite conclusions regarding the lasting results of the operations. It seems, however, apparent from our observations that as to efficacy in glaucoma simplex this operation is by no means inferior to the other modern operations for glaucoma, e.g., Elliot's trephining.

Holth's aim in his new sclerectomy is, as we know, to *reduce the risk of late infection*, the danger common to all operations producing a sub-conjunctival fistula from the anterior chamber. We have the experience that this danger is not the least in eyes operated upon after Elliot's method. Holth believes that by making the sclerectomy more peripherally, farther from limbus than possible with a trephining operation which opens the anterior chamber, he

will obtain a more solid conjunctiva over the opening; by this means the fistula will have a thicker cover and be better protected against the entrance of microbes. Can we, from our cases, say whether this aim has been achieved? It is of no consequence that until now* no case of late infection has been observed, the cases being too few and the time of observation too short to draw any conclusion from this fact.

However, in this respect *the appearance of the scar* is no doubt of great importance. The thin-walled bubble-shaped scar is justly feared as disposing to late infection, especially if situated close to the limbus; it is easily injured by the rubbing of the edge of the eyelid, and thus facilitates the entrance of microbes. For this reason I have examined our cases, especially with regard to these conditions.

The *ideal condition* must be considered to be the *smooth scar combined with normal tension;* such a scar I have found in no fewer than *nine cases.* The most common is a flat, more or less glassy cushion, through which the sclerectomy opening can be distinguished as a dark blot. Sometimes a diffuse oedema of the conjunctiva over and above the scar is found without formation of any cushion.

In two of the cases which have been longest under observation there was seen a glassy distinctly limited cushion with a faint trace of bubble formation (both eyes of the same patient). It must, however, be observed regarding these bubbles that they were 2 or 2.5 mm. removed from the limbus. By their peripheral position these bubbles are better protected than if they had been close to the limbus, where they very often appear after the sclero-corneal trephining.

There is one condition which I believe is of importance for the appearance of the scar, viz., the size of the scleral defect, in other words the size of the blades of the punch forceps. A comparison between Group I, where the sclerectomy is made with a punch forceps of 1.5 mm. and Group II with a punch forceps of 1 mm. is to the advantage of the latter. On the whole I am of opinion that these *scars,* after Holth's operation, have a *favourable* appearance.

Finally I will shortly mention the experience we have had with this operation for *other forms of glaucoma.*

We have performed the operation for *buphthalmus* six times on two children, on one child twice on each eye, on the other child once on each eye. Three times double sclerectomy was performed. The result with both patients was reduced tension, but after they left the hospital pilocarpin had still to be applied.

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*Until July, 1922, no case of late infection has been seen.—THE AUTHOR.

The operation was performed once for *acute inflammatory glaucoma* (after a prodromal attack) with a good result; smooth scar with good tension six months after operation; and once for *chronic inflammatory glaucoma* with a less good result: T. 5.5/2 Schiötz.

Finally, we have performed the operation four times for *secondary glaucoma*. On one patient the same eye was operated upon twice for staphyloma corneae with transitory effect only. On the other two patients the operations were performed quite recently.

The number of patients is, as shown, too small to make a definite statement regarding the results in these forms of glaucoma. On the whole, however, the efficacy of all fistula-forming operations is more doubtful in cases other than glaucoma simplex.

ENTOPTIC APPEARANCES OF SENILE CATARACT

BY

A. G. EAST

TRURO

THESE sketches representing the entoptic images of senile cataract as observed over a period of more than six years were kindly sent to me by one of my patients, and seem to me to be of rather

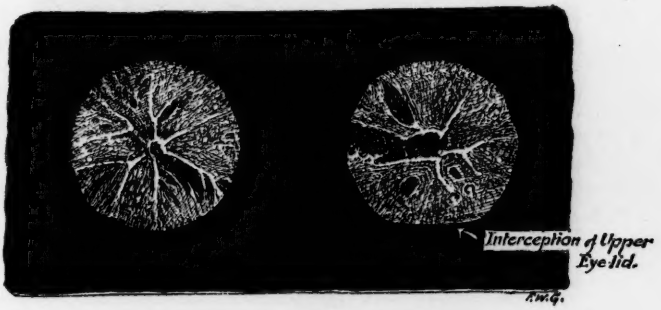

FIG. 1.

LEFT EYE. RIGHT EYE.

Images in Reverse of Crystalline Lenses.

unusual interest, as it is not often that one comes across people with the ability to represent accurately, in the manner shown, the pathological changes occurring in their own lenses.

The sketches were made with the aid of a pin-hole in a black card, held between the window and the eye.

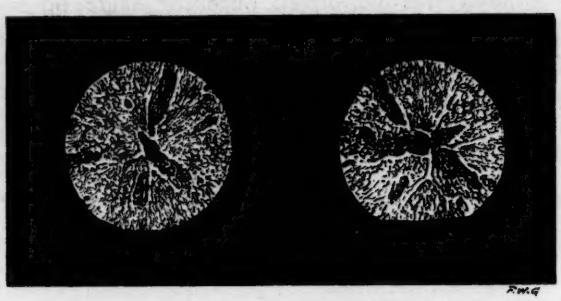

FIG. 2.

LEFT EYE. RIGHT EYE.

Inverted Image Crystalline Lenses. Sketched January 25, 1919.
See also No. 3.

No. 1, drawn in October, 1915, represents a stage of the process in which the vision was:—

Right 6/9? with + 0.75 cyl. Ax. 90°=6/6.
Left 6/6?? with - 0.25 sph. = 6/6.

When Nos. 2 and 3 were sketched there was no record made of his visual acuity.

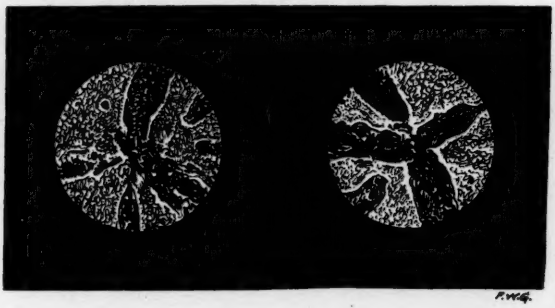

FIG. 3.

LEFT EYE. RIGHT EYE.

Inverted Image Crystalline Lenses. Sketched January 30, 1922.

No. 3 represents the condition as it was when I saw him in January, 1922.

His vision with correction was—

R. 6/9 L. 6/12.

The changes in his lenses are clearly seen with the plane mirror of an ophthalmoscope.

ANNOTATIONS

F.R.C.S. (with Ophthalmology)

The first examination for the F.R.C.S. (with ophthalmology) has been held and one candidate has received the diploma. Although the entry was not a large one, it is expected that it will grow in the future, as no doubt the leading London hospitals in the course of time will demand this qualification for Ophthalmologists. The examination consisted of two papers, a clinical examination, *viva voce*, and examination in operative surgery on pigs' eyes. The questions in the papers are given below.* The questions are simple and straightforward, and unless a very high standard was required in answering them they are no more difficult than those set for the D.O.M.S. examination. The clinical examination consisted of a written commentary on a case and a *viva voce* on a number of other cases. Pathological specimens were also exhibited. We sympathize with any candidate who has to operate on pigs' eyes, in their flabby half-macerated condition, under the tension of an examination, and we can only suppose that the examiners mark according to the manner in which the candidate exhibits his knowledge of the use of the instruments employed.

The Use of Light as an Aid to Aerial Navigation

Last September we dealt with the question of dazzling by motor headlights and discussed some of the remedies suggested. So far no perfect solution seems to have been found. The same problem has also to be faced in aerial navigation with the added difficulty of the greatly increased speed attained by aircraft. Colonel Blandy read a paper before the Illuminating Engineering Society and the Royal Aeronautical Society's joint meeting last January in which he dealt with the whole question of the use of light as an aid to aerial navigation. The International Convention for aerial navigation in Annexe D, Section 1, contains certain proposed "Rules as to

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*** F.R.C.S. (with Ophthalmology) Examination Papers**

PAPER NO. 1.—*All questions must be answered.* (1) Describe the origin, insertion, nerve supply, action and relations of the Levator Palpebrae Superioris, and the Inferior Oblique. (2) Describe the structures and their functions by which tears pass from the conjunctival sac to the nose. (3) To what is the normal intra-ocular pressure due, and how is it maintained? (4) Describe, with the aid of diagrams, the theory of retinoscopy.

PAPER NO. 2.—*All questions must be answered.* (1) How may secondary glaucoma be produced? Indicate your treatment for the various conditions. (2) Write an account of glioma of the retina giving its minute structure and clinical appearances. (3) Describe the concussion changes which are met with in the retina, choroid and optic nerve.

Lights" and there states that the prescribed navigation lights must not be dazzling. The word is not further defined and, owing to the intense darkness in which night air navigation is frequently done, it may be found that the solution of the problem may be a very difficult task. The Convention also prescribed that aircraft should carry four lights, a white one at the bows and at the stern, visible at a distance of eight kilometres, a green one on the right side and a red one on the left side, each visible at five kilometres. Colonel Blandy pointed out that in the case of two approaching aircraft travelling at the rate 3.3 miles per minute the white light would be visible 90 seconds before meeting and the side lights only 50 seconds. The range of visibility, particularly of the side lights, may well have to be increased in the near future. In addition, a carefully designed screen has to be devised in order to eliminate the fringe angle without interfering with even illumination over the prescribed dihedral angle of 110 degrees. Another difficulty has been found in obtaining the correct formula for the tinting of the coloured glasses. That given by the present methods does not work well when high intensity filaments are used. Many other interesting optical problems in connection with aerial lighthouses, the illumination of landing grounds and aerodromes, and the internal lighting of the craft itself have also to be dealt with. A full report of Colonel Blandy's paper and the subsequent discussion in which several well-known air-men took part will be found in the February number of "The Illuminating Engineer."

ABSTRACTS

I.—THE ESTIMATION OF THE LOSS OF WORKING CAPACITY IN TRAUMATIC CATARACT

Rasquin, E.—The estimation of the loss of working capacity in traumatic cataract. (L'évaluation de la réduction de capacité de travail dans la cataracte traumatique.) *Arch. med. belges,* November, 1918.

Rasquin points out that, in spite of numerous discussions on the subject, the question of the exact amount of loss of efficiency due to traumatic cataract is still very unsettled. The Guide-Barème des Invalidités of France makes no mention of it directly, but says that, whatever the nature of the lesion, the degree of visual acuity is to be taken as the base in calculating the loss, and also that paralysis of accommodation, which is frequently associated with a dilated pupil, is to be regarded as an infirmity reckoned at 5 to 20.

Rasquin points out that there are four main factors to consider. The loss of an organ (the lens); the loss of accommodation; the loss of binocular vision; and, in the majority of cases, the loss of visual acuity. He thinks the most satisfactory method is that of Aubineau and Bonnaud, which is as follows:—The indemnity is to be calculated according to the reduction of visual acuity found after correction and is to be increased by half of the remaining value attributed to the eye in question. ("On calcule l'indemnité d'après la réduction de l'acuité visuelle obtenue aprés correction optique et l'on augmente de la moitié du reste de la valeur attribuée a l'oeil en cause.") Thus a soldier who has lost the lens of the right eye and possesses 8/10 of vision after correction, with normal vision in the left eye, has his working capacity reduced by 18 per cent. The defective eye is worth 30 per cent. since there is a reduction of visual acuity of 2/10. He therefore gets 2 × 3, that is 6 per cent., for this, and $\frac{30-6}{2}$, that is 12 per cent. for the other factors; this makes a total of 18 per cent. Other illustrative cases are given, but in all the exact working of the formula seems a little obscure.

Another factor to be taken into account is the possibility of subsequent deterioration of vision in an aphakic eye. On this account the first estimation should be a temporary one and liable to subsequent correction.

Rasquin sums up:—

"1. Aphakia should not be indemnified at the same rate as the professional loss of an eye.

2. The estimation of the incapacity should be based on the reduction of visual acuity (after correction) increased by half the remainder of the professional capacity of the eye.

3. The estimation should not be definite when it is made immediately after the absorption of the cataract."

E. E. H.

II.—A QUANTUM THEORY OF VISION

Joly, Prof. J. — A quantum theory of vision. *Philosoph. Magazine*, Vol. XLI, Feb., 1921, and *Amer. Jl. of Physiological Optics*, April, 1922.

Joly assumes in his theory that the origin of luminous and colour vision is to be sought in the liberation of electrons under light stimulus, within a photo-electric substance existing in the retina. Rhodopsin, being such a substance, would appear probably to be the intermediary between the light and the nerve, which translates the quanta of light energy into nerve stimulus.

Certain well-ascertained facts of photo-electric science concern the theory, e.g. :—

(1) The electron is liberated with a velocity which normally depends on the frequency of the light only.

(2) For equal intensities of light of different frequency, the light of highest frequency liberates most electrons, and *vice-versa*.

(3) The electron, in most cases, absorbs one quantum, the value of which depends on the frequency. In virtue of this absorbed energy, the electron acquires a certain velocity, and pursues a certain free path in the medium, till diverted by collision.

As the rods contain the sensitizer (rhodopsin) within themselves, it is assumed that an electronic emission in a rod constitutes an intimate, and generally, copious source of stimulus. The conditions here, therefore, are favourable to the appreciation of feeble illumination. The quantitative value of the stimulus being developed at the expense of its qualitative nature, colour is not interpreted to the brain, or only defectively. The confused flow of stimuli correspond to " noise in the case of audition."

The cones mainly differ from the rods in that they contain no visible quantity of rhodopsin, and that each one is connected, through a separate ganglion cell, to the optic nerve. It is assumed that the outer segment of each cone is bathed in a photo-sensitive fluid, almost certainly rhodopsin. In this sensitizer light is absorbed and some of the electrons emitted are of sufficient velocity to enter the cone. The speed, trajectory, and energy of these electrons are characteristic of the frequency of the light, i.e., of its " colour." Such stimuli are too few and brief to confuse one with another by over-lapping. " They are appreciated at their cerebral destination as would be successive notes heard in music."

In regard to the question of primary colour sensations, the author believes a complete detailed analysis by the light-sensitive part of the brain of the whole gamut of wave-lengths between the red and violet, to be probably unattainable. He regards an evolutionary growth of three highly developed colour sensations to be nature's compromise with her limitations.

He explains the colour-blind individual as one whose foveal nerves respond feebly to certain quanta.

The author then proceeds to review certain well-known phenomena of colour vision in the light of his theory. He concludes in pointing out that the study of colour vision is hampered by many difficulties, chief among which is the elusive and variable nature of the effects under observation, and he pertinently asks " what alternatives have we to a quantum theory at the present time? "

E. M. MAXWELL.

III.—THE VALUE OF VARIOUS METHODS OF RETINOSCOPY

Steward, Charles.—The comparative value of various methods and practices in skiametry. *Amer. Jl. Physiological Optics*, April, 1922.

The author commences by briefly referring to certain factors which may affect the subjective examination of the refraction of the eye. Such are the effects of varying illumination, the greater readiness in perceiving some letters in the test types to others, the influence upon the acuity of vision by the size of the pupil, and so on. Such sources of error must necessitate some objective methods of examination.

He then proceeds to a discussion on the method of static skiametry. His own procedure is to work at a distance of about twenty-six inches, and allow one dioptre only for the working distance. He induces passive fixation by a gradual reduction of strong convex glasses in hypermetropia, and by an increase of concave in myopia. He determines both binocular, as well as monocular, findings.

He reduces retinal sensitiveness to light by employing a self-luminous retinoscope, controlled through a resistance. He maintains that one of the main sources of error in the method, e.g., that the findings are seldom made along the visual axis, can be remedied by a scheme, consisting of mirrors which reflect the form of a distant letter into the observed eye.

He claims for static skiametry, when properly performed, that it affords " the most accurate determination of the refractive excesses and deficiencies when the eyes are engaged in the general work of distance seeing."

To dynamic skiametry, however, he thinks, we must turn, if we wish to investigate the amplitude of accommodation, its excesses or deficiencies, or to find out how much assistance the eye would accept under any specified conditions of relative accommodation and convergence.

His procedure in this method is to employ a simple form of plane retinoscope, with a printed card attached to serve as a fixation point. The observation is made, as a rule, at a distance selected by the patient as his usual reading or working length. To ensure illumination of the card, the examination should be made in a room fairly well lighted artificially.

Apart from the fact that this method is one of the most useful in determining abnormalities of accommodation, the author claims for it the following advantages:—

(1) The small pupil obtained tends to eliminate the spherical aberration of peripheral zones.

(2) The refraction of the macula can be examined without the aid of auxiliary devices.

(3) Small errors of astigmatism are most readily detected.

(4) It is the only objective method for the examination of presbyopia.

E. M. MAXWELL.

IV.—TAY-SACHS'S DISEASE

Torrance, Herbert Watt.—Tay-Sachs's disease: A study of the symptomatology and pathology of three atypical cases. *Glasgow Med. Jl.*, April, May and June, 1922. (From the Medical and Pathological Departments, Royal Hospital for Sick Children, Glasgow).

Ophthalmologists are much indebted to **Torrance** for his article (prepared as an M.D. thesis) in which he not only describes three cases which he considers to belong to the juvenile form of Tay-Sachs's disease (with pathological examination), but enters very fully into the literature. In doing this he has sought to show, successfully one feels, that there are connecting links between the infantile form with racial predisposition to Jews and the juvenile form without such predisposition, and, further, that his cases, which he believes to be the youngest belonging to the juvenile type in which a pathological examination has been made, are examples of such links. Torrance begins by discussing the different names which have been given to these conditions and adopts the terms " Infantile Tay-Sachs," commencing at under one year, with predilection for Jews, and " Juvenile Tay-Sachs " commencing after the first year and without predilection for Jews. He next discusses the symptomatology of the two types and enters fully into the literature of the juvenile type in such a way as to prove that there are " links " between the infantile and the juvenile type. With his three cases, which, by the way, are from the wards of Dr. Leonard Findlay at the Royal Hospital for Sick Children, Glasgow, the literature investigated in this part of the thesis totals sixty-seven cases of the juvenile type. At this point it may be useful to quote the summary of symptoms of the disease slightly abbreviated.

Infantile type (from Osler and M'Crae):—

(1) Mental impairment during the first months of life leading to absolute idiocy.

(2) Pareses or paralyses.

(3) Reflexes normal, deficient or increased.

(4) Blindness, cherry-red spot in macula, optic nerve atrophy.

(5) Marasmus, death usually before age of two years.

(6) Disease occurs in several members of same family.
(7) In some cases there are nystagmus, strabismus, hyperacusis, convulsions.
(8) Children healthy at birth.
(9) Racial predisposition.

Juvenile type (from Vogt) :—

" A hitherto healthy child (usually more than one in family without any special race predisposition) becomes ill during the school age, sometimes between the age of 14 and 15. The children in the same family become affected in the same year of life. The beginning is gradual—the first symptom is usually the failure of sight—but loss of mental capacity or motor weakness may first appear. The loss of sight passes in the course of months to complete blindness. Ophthalmoscopically there is atrophy of the papilla. The mental development stands still or goes back. The children do not progress in the school, soon lose the acquired capacity to read and write, and, lastly, of speech. They become unsocial, dirty in eating, unclean in habits, and totally inattentive to their surroundings, no longer know their own mother or make articulate speech. Little by little they become completely demented. Hand in hand, in most cases, there is diminution of motor function, at first weakness in the limbs and back, later complete paralysis. The paralysis is sometimes flaccid, sometimes spastic, leading to complete helplessness, atrophy and death."

Torrance concludes from these investigations that there are connecting links in regard to age incidence, in regard to race proclivity and in regard to eye symptoms, between the infantile and the juvenile forms. Notably, perhaps, in regard to eye symptom links, we have the facts that nystagmus and optic atrophy occur in both, that the appearance of the cherry-red spot with its pale coloured zone in infantile cases, may change and so come to resemble the juvenile type, that a true infantile case is reported, in which there was no pathognomonic cherry-red spot, that some juvenile cases have red spots at the macula, and, that there are some families with juvenile Tay-Sachs's in which there is a mixture of types, some members having macular red spots, while the other affected members have no such changes.

The next chapter of the article is concerned with the symptomatology of Torrance's three cases—D. H. (male), M. H. (female) and A. H. (female). When admitted to hospital D. H. was $4\frac{1}{3}$ years, M. H. $3\frac{1}{2}$ years and A. H. $1\frac{1}{4}$ years of age. A summary of the cases may suffice :—

Family history, negative. Obstetric histories, good. Growth and development normal until the age of one year, up till when no illness. Onset of disease at one year. Parents, Gentiles.

Present illness and condition on admission.—Progressive mental and physical deterioration. Nystagmus, dental caries, cessation of attempts at walking and talking were the earlier observations. The later symptoms were apathy, listlessness, screaming fits and progressive mental enfeeblement. When admitted to hospital the arms were spastic. The arms and knee jerks were on the whole exaggerated. Babinski positive. Bladder and rectum not under control. Double optic atrophy without macular changes. Tuberculin and Wassermann reactions were negative.

Death was due to broncho-pneumonia in each case. Ages at death were 4 years 4 months, 3 years 2 months and 2 years 5 months.

The author passes on to the pathological aspects. He gives in full the results of pathological examination of his own cases and makes comparison with other examinations. This part of the article is too long and detailed for useful abstraction; reference should therefore be made to the original. The histological technique as regards the retinae was admittedly unsatisfactory.

Torrance concludes that his cases, being the youngest in the list of juvenile cases, most closely resemble the infantile group in age incidence, and that they also resemble this group histologically. They present the typical triple syndrome of degeneration of the optic nerves, nerve fibre layer and ganglion cells.

The bibliography contains 59 references, covering, of course, a larger number of cases. There are nine photographs of central nervous system conditions.

ERNEST THOMSON.

V—OCULAR AFFECTIONS IN SYPHILIS AND TRYPANOSOMIASIS IN AFRICA

Roy, J. N. (Montreal).—The ocular affections in syphilis and human trypanosomiasis amongst the natives of Africa. (Les affections oculaires dans la syphilis et la trypanosomiase humaine chez les indigènes de l'Afrique.) *Ann. d'Ocul.*, Vol. CLVIII, March, 1921.

In his last tour in Africa, **Roy** visited twenty-two different colonies. If the geographical distribution of sleeping sickness is relatively easy to make, since this affection originated in Africa, it is very different in the case of syphilis, which has been introduced at various times and by multiple channels. The author discusses the various theories of the origin of lues—Sydenham, Haller and Sprengel (1796), and discusses the influence on the nearest land

masses of Europe and Asia. He declares that in South Africa, consequent on the numerous wars waged there, lues has spread enormously and destroyed great numbers of otherwise strong and healthy natives, the disease being here called the " white man's disease." He has many points of interest connected with the distribution of sleeping sickness.

He had occasion to examine and study 135 natives in whom the diagnosis of syphilis had been established, and it is the result of his observations on the ocular manifestations of the disease that he now wishes to record. Thirty-eight among them had a perforation of nasal septum or of the hard palate, or of both together, and 20 others had bony lesions. These cases had then been very strongly infected, but nothing special was noted except a peculiar alteration of the buccal mucosa.

Considering how careless and late the treatment is that may be carried out by these natives, Roy has been struck by the resistance of their eyes, and especially of the deep membranes, to the action of the spirochete of Schaudinn, also to the spirochaete of Castellani where, in yaws, apart from some pustules on the lids, no disease of the eye was found. In the 135 cases of syphilis examined, he found 16 cases with ocular manifestations, and, with the exception of one case, all the lesions affected the anterior segment.

Acute iritis	3 cases
Irido-choroiditis (old or acute)	8 ,,
Parenchymatous keratitis	4 ,,
Affection of choroid	1 ,,

No condylomata or gummata of lids or iris. The retina has always been found healthy and the natives, as a general rule, are very little exposed to albuminuria, diabetes, leucaemia, or other causes which usually produce an alteration of this structure. The reason for this may be the life, the diet and the freedom from intoxicants. Paralysis of ocular muscles and optic neuritis were not found. Locomotor ataxy and grey atrophy were alike unseen; the author declares that these diseases belong to the white race. The mulatto, however, follows the white race in susceptibility to diseases of the bone and spinal cord, as also does the creole.

Roy agrees with Santos Fernandez of Cuba, that the eyes of the negroes are very rarely affected in lues, thus differing from the opinion expressed by Pollot, who, Roy suggests, may have failed to distinguish between negroes and mulattos in this connection. Different types differ in their immunity to lues, but it would appear that a mixture of races leads to a greater infectivity.

As regards manifestations of human trypanosomiasis, Roy quotes the opinions of Thiroux and d'Anfreville on four negroes —two iridocyclitis, one diffuse keratitis and one defective vision with hemeralopia—and of Dr. Heckenroth who told him of one case of parenchymatous keratitis, who was not luetic. Roy is aware of seven observations among Europeans. He himself, while in Africa, examined 418 negroes affected with this disease and concluded that ocular affections were excessively rare—three cases only having been discovered, and even these are not beyond doubt. Short notes of these three are given. All three had double papillitis, two of them having also meningitis.

Roy, more than once, mentions the extraordinarily acute vision of the negro, and this was particularly so in the trypanosomiasis cases—one boy of eighteen in the Belgian Congo having vision of 20/5. Argyll Robertson pupils were never met with. In his 418 patients he found 19 white atrophies, all consecutive to treatment by atoxyl, or other arsenical salt. He saw no cases of lid oedema, iritis, cyclitis, irido-cyclitis, parenchymatous keratitis, of choroiditis, or choroido-retinitis; possibly, he suggests, the result of all the patients being already under treatment. If we compare the published observation we see that the percentage of ocular affections in human trypanosomiasis is much greater in Europeans than in negroes, whilst the period of incubation is also much shorter in the former than in the latter, and Roy considers that, as in the parallel case of lues, the negro's eye has more resistance to the trypanosome.

A bibliography of fourteen references is given at the end of the paper.

W. C. SOUTER.

VI.—THE TREATMENT OF RETINAL DETACHMENT

Gonin, J. (Lausanne).—The treatment of retinal detachment. (Le traitement du décollement rétinien.) *Ann. d'Ocul.*, Vol. CLVIII, March, 1921.

Following up his previous study on the anatomical causes of retinal detachment, published in the *Annales d'Oculistique* for May, 1919, **Gonin** has presented a second article to the Society of Swiss Oculists on the clinical diagnosis and the treatment of the different forms of retinal detachment. In his present paper he limits his remarks to the idiopathic or " cryptogenic " (Terson) variety, the one most commonly calling for treatment. He shows that the

retraction effect of vitreous haemorrhages is not responsible for the extensive detachments because of the previous production of tears or perforations of the retina, which allow intercommunication of the sub-retinal with the vitreous fluid. The shape of these rents, either V or U, with the base directed towards the periphery, would tend to show that they are produced by traction, acting from behind forward, on the anterior surface of the retina. There are, at most, two or three tears near each other, whilst they are found in recent detachments more regularly than in old ones, thus showing that they are not an end phenomenon. The number found is greater according to the increased care with which the periphery of the fundus is examined. Their importance is concerned largely with prognosis and they indicate the futility of certain methods of treatment. He finds that the cases with the most rapid onset, and at the same time the least favourable, are cases where the detachment has started in the upper parts of the eye. In simple cases this pendulous prominence works its way round, either by the nasal or temporal side, until it reaches the lower portion of the eye in two to four weeks after the start. If it passes by the macular area it may produce irreparable damage. This " sinking " of the detachment is evidently not due to a greater density of the choroidal exudation forming the sub-retinal fluid, seeing that the retinal rents allow free interchange of the fluids. Detachment starting in the lower part of the eye has a much more gradual and subtle onset, and frequently the ophthalmoscopic appearances are much less obvious.

Gonin believes that spontaneous detachment of the retina is preceded, as a rule, by a detachment of the vitreous body, but the detachment of the vitreous goes along with the separation of its fluid part from its connective stroma, which Gonin calls its pulp, and which retracts from behind forward, abandoning its relations of contact with the retina, except at the points where adhesion had already been formed between the two membranes. His specimens showed that the volume of the retracted vitreous was larger in the lower part of the eye than in the upper. The weight of the vitreous probably exercises some influence, especially when one considers the frequent movements of the eyeball. Closure of the retinal rent would cause the case to present the same feature as does a sub-retinal exudation, which may either absorb completely or become transformed into a fibrinous mass uniting the choroid to the retina. Gonin presents four diagrams to illustrate his views on this point of the shrinkage of the vitreous.

The methods of treatment are discussed under three headings—that of Samelsohn with, or without revulsive treatment, sub-conjunctival injections, and scleral punctures.

(*a*) The compression bandage is perhaps the most universally

employed, but not always with a clear understanding of its rationale; it suffices that it should be an immobilising bandage. While freedom from movement is necessary for the closure of the retinal rents, or the disappearance of the fluid lying behind the retina and, finally, for the establishment of a choroido-retinal scar, closure of the eye without any bandage would do all that was required. The supine position in bed also has been similarly advocated. As Leber has pointed out, the dorsal decubitus is especially important in upper detachments, but has no further utility when the displacement has been transferred to the lower portion. Gonin argues that, depending on the situation of the detachment, the position of the head on the pillow should be altered from the strictly horizontal position usually recommended.

(*b*) Sub-conjunctival injections are sometimes combined with the treatment of Samelsohn and sometimes used separately, but Gonin fails to see what useful purpose they can serve in drawing off fluid in the presence of the retinal rents. He does not seem to believe in them.

(*c*) Scleral punctures cannot be expected to be of much service so long as the rents are open, but thermo-cauterization may assist in forming an adhesion between retina, choroid and sclerotic, but these three tissues must all be touched by the cautery—a simple episcleral cauterisation is useless. This fresh adhesion very often leads to other detachments—sometimes in the opposite part of the eye. Gonin's experience of perforating thermo-cauterization comprises results of three degrees:—

(1) Useless—when the sub-retinal fluid has not been completely evacuated by the scleral puncture, or where it has reproduced itself so quickly that the adhesive scar has not been able to develop.

(2) Lasting cures by complete reapplication of the retina, the region of the scar alone continuing to discharge its visual functions.

(3) Localized reapplication at point of cauterization, but extension of the detachment at the opposite region, probably by traction of the mass of the vitreous towards the scar.

Finally, Gonin refers to Deutschmann's procedure of dilaceration of the vitreous in an effort to sever the adhesions which are the direct cause of the detachment. Deutschmann reserves his treatment not for cases of recent detachment, but for old ones in which all other treatments have failed. Gonin remains sceptical regarding this treatment in spite of the fact that Deutschmann claims to have had 94 cures, i.e., 23.5 per cent. of 400 patients treated.

W. C. SOUTER.

CORRESPONDENCE

SCULCO'S TREATMENT

To the Editor of THE BRITISH JOURNAL OF OPHTHALMOLOGY

SIR,—Experience of Sculco's method of treating trachoma may be of some interest to ophthalmic surgeons. An abstract of Dr. Sculco's report to the Academy of Medicine, Naples, was published in the Journal of December, 1919. Through the courtesy of the editor of *La Clinique Ophtalmologique*, I was able to get four samples of the remedy from Dr. Sculco. It is a dark green powder which is to be shaken on the conjunctiva daily, kept there for one or two hours and then washed out.

I tried it on three patients in hospital, two well-developed cases, and one recent. One eye in each case was treated with copper sulphate and irrigation and the other with Sculco's remedy for ten to twenty days. The result in each case was that right and left eyes improved to an apparently identical extent, i.e., they were cleaner and less inflamed but the granulations remained unchanged. Pain, chemosis and increased discharge are to be expected in using the remedy but none of these was present in my patients. It may be that the powder had deteriorated on account of the heat.

Yours truly,

BASRAH. P. MCRITCHIE.

THE ESTIMATION OF REFRACTION WITHOUT A CYCLOPLEGIC

To the Editor of THE BRITISH JOURNAL OF OPHTHALMOLOGY

SIR,—At the recent Congress of the Ophthalmological Society of the U.K. the champions of cycloplegic and non-cycloplegic estimation of refraction were in friendly conflict. It was suggested by the champions of the latter method that for the performance of retinoscopy at the macula it is necessary for the surgeon to use his right eye for the patient's right eye, and his left eye for the patient's left eye in order that distant fixation may be obtained. Mr. Harrison Butler went so far as to say, I gathered, that estimation under homatropin might show a lower reading of hypermetropia than does the subjective test at the types without homatropin. I agree whole-heartedly with the statement that owing to differences between the refraction at the macula and at

the other regions close to the macula, it is most important to obtain the macular refraction. But, Sir, is it not the case that if the surgeon dazzles with his mirror the eye which he is examining while the other eye fixes—if it can—a distant point, there is a possibility that there may become manifest any muscle errors which the patient may happen to have, and that the examined eye will deviate, however slightly, and vitiate the results obtained? Apart from all other arguments, there is this to be said for cycloplegic estimation, that the patient without accommodation is able to look at the mirror with the eye under observation, and can yield up his exact static refraction, the necessity for a permanent record of which was so well emphasized by Mr. Ernest Clarke.

Yours, etc.,

ERNEST THOMSON.

FILARIA LOA

To the Editor of THE BRITISH JOURNAL OF OPHTHALMOLOGY

SIR,—In answer to your correspondent Dr. E. Charles' enquiry in the July number of the BRITISH JOURNAL OF OPHTHALMOLOGY, he will find in the *Lancet* for 1919, Vol. II, page 874, an account by Dr. E. L. Hunt and myself of a similar case, and on page 946 of the same volume a letter from E. J. Tyrrell reporting another case.

I had no trouble in removing the female worm of a filaria loa, and the chief thing about the patient, in my recollection, was the extreme horror he evinced at his condition. He expressed himself as deeply indebted to me for my assistance; in fact, he did not know how adequately to reward my services. I thought he was speaking metaphorically, but he really meant it, for he made no effort to pay my fee.

Yours truly,

R. R. JAMES.

46, WIMPOLE STREET, W.1,
July 1, 1922.

SCLERO-CORNEAL TREPHINING AND HOLTH'S EXTRALIMBAL TANGENTIAL SCLERECTOMY

To the Editor of THE BRITISH JOURNAL OF OPHTHALMOLOGY

SIR,—I regret that I have been so long in replying to Professor Holth's letter, but the delay has been due to my absence from England, and to other causes over which I had little control.

I am indebted to Professor Holth for acknowledging and rectifying the inaccuracy in his original statement, and I would ask anyone who is sufficiently interested to read for himself the passages under reference in Duane's book.

With regard to Professor Holth's main contention as to the frequency of late infection in America, I have recently returned from that country, where I visited four of the largest towns, and had the opportunity of discussing this question very fully with a number of distinguished specialists including Dr. Duane himself. I was confidently assured that they had seen very little of this complication, and that Professor Holth's opinions on the subject are by no means widely shared in the United States.

I have never wished to understate the seriousness of late infection when it occurs, but the opinions of a number of distinguished American experts, who are themselves performing the trephine operation on comparatively large numbers of patients, has fortified me in believing that late infection should be, and is, a very infrequent complication, provided good operative conditions exist.

Yours truly,

R. H. ELLIOT.

54, WELBECK STREET, W.1,
July 4, 1922.

THE BOWMAN LIBRARY.

To the Editor of THE BRITISH JOURNAL OF OPHTHALMOLOGY

SIR,—The following parts of journals are missing from the Bowman Library, and many of them are now unobtainable. May I appeal to those of your readers who have spare copies which they do not wish to keep, to send them to me, in order that the periodicals in the library may be brought up to date, as far as possible?

Yours faithfully,

R. R. JAMES (Librarian).

46, WIMPOLE STREET, W.1.

Klinische Monatsblätter für Augenheilkunde, Vol. LXV, October, 1920.

Annales d'Oculistique, January, 1920.

Archives d'Ophtalmologie, August, 1920.

Knapp's *Archives of Ophthalmology,* No. 6, 1915, No. 2, 1916, Nos. 2 and 6, 1918, the whole of 1919, Nos. 1, 2, 3 and 4, 1920.

Ophthalmic Record, Vols. for 1913, 1914, 1915, 1916, 1917.

American Journal of Ophthalmology, October, 1913, May, 1914.

Annals of Ophthalmology, Vol. 1919, No. 1, January, 1917.
The Ophthalmoscope, Vol. VII, 1909.
Moorfields Reports, Vol. XVII, Vol. XX, part 2.
Archivos de Oftalmologia Hispano-Americanos, August, 1914, May, 1916.
Revue Générale d'Ophtalmologie, January, 1920.
Revista Italiana di Ottalmologia, 1914, Nos. 11 and 12.

BOOK NOTICE

A Treatise on Glaucoma. By R. H. ELLIOT. Oxford Medical Publications. Pp. 637. Illustrations 213. 2nd edition, 1922. Price, 30s. net.

The present edition of this work is improved in many ways; it is a good deal increased in size, about 50 illustrations have been added so that they now number 213; and an attempt has been made to bring the subject matter up to date, an attempt which may be said to have been entirely successful.

This is a book which anyone will certainly acquire who wishes to be fully informed with regard to the glaucoma problem in all its many aspects, and at the same time there is much of a more general ophthalmological interest; thus 60 pages are given to the consideration of the intraocular tension and pressure, 20 pages to tonometry, while perimetry and other subsidiary matters are considered with corresponding completeness.

There are few of the newer operations for glaucoma which do not receive notice, but, as is to be expected, sclero-corneal trephining receives an especially full and detailed consideration.

The illustrations are from various sources and for the most part are excellent. Many are original.

In some parts such a multiplicity of signs and symptoms and views are put forward as to lead to confusion; one feels that their inclusion is the outcome of a laudable desire to include views, however diverse, of the many workers in this field. At the same time one feels that a number of them do not add to the value of the work.

A collection of references is given at the end of each part of every chapter which will prove of great value. They, however, would have been of greater value had they been more complete, and had the general convention with regard to references been adopted. In many instances the date, or the number of the volume, or the

page is missing. Thus on page 440 there are 43 references; in 13 of which the page is not included, and in 25 the year is missing.

The book can be confidently recommended to all ophthalmic surgeons as being the best available on this complicated subject.

NOTES

Deaths

On July 7 LOUIS HENRY TOSSWILL died at Exeter, at the age of 79 years. He was a graduate of Cambridge University, an original member of the Ophthalmological Society, and a member of Council from 1896-99, and was at one time Surgeon in the West of England Eye Infirmary, and in 1903 was appointed Consulting Surgeon. In 1907 he was President of the Ophthalmic Section of the British Medical Association at its meeting at Exeter.

We regret to report the death at Branksome, Bournemouth, of HENRY GEORGE FREAN, only son of the late George M. and Mrs. Frean, aged 38 years. Mr. Frean took the D.O. at Oxford in 1914, and became School Oculist to the Berks County Council and to Oxford City Council and Oxford City. He was Senior Clinical Assistant to the Oxford Eye Hospital. He served in Egypt during the War, where he was taken ill. Recovering, he went out again, this time to Salonika, and, later on, to the Caucasus. On demobilization he returned to Oxford and resumed his work, but his health was permanently undermined. He steadily grew worse, so that in the following spring he was compelled to give up his appointments, much to the regret of his colleagues. He spent two winters in Switzerland, but during the last few months grew rapidly worse and died on June 18, 1922. He had a particularly charming personality, and was an all-round sportsman.

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Appointments

DR. MAITLAND RAMSAY has been appointed Consulting Ophthalmic Surgeon to the Western Infirmary, Glasgow.

LIEUT.-COL. FREDERICK O'KINEALY, C.I.E., I.M.S., Chief Medical officer to the Prince of Wales during His Royal Highness's Indian tour, has, on the occasion of the Prince's return, been appointed a Commander of the Order of the British Empire.

MR. N. BISHOP HARMAN, M.B., F.R.C.S., has been elected a Corresponding Member of the Société Nationale des Sciences Naturelles et Mathématiques de Cherbourg, in recognition of his researches into the origin of the Facial Musculature.

MR. O. G. MORGAN has been appointed Ophthalmic Surgeon to the Italian Hospital, Queen's Square, W.C.

MISS IDA C. MANN has been appointed Ophthalmic Surgeon to the Garrett Anderson Hospital.

MR. HERBERT CAIGER has been appointed one of the Medical Referees for Ophthalmic cases under the Workmen's Compensation Act for County Court Circuit No. 13 (Sheffield, Barnsley, Glossop).

MR. J. BARBOUR STEWART has been appointed Surgeon to the Glasgow Eye Infirmary.

MR. A. LEONARD WEAKLEY has been appointed Oculist to the Anglo-Swiss Hospital, Lady Cromer's Dispensary, Alexandria.

MR. R. H. DICKSON (Newcastle, Staffs.), has been elected President of the Staffordshire Branch of the British Medical Association. The Presidential address was on "The Relation between Ophthalmology and General Medicine and Surgery."

DR. T. H. SHASTID, of Wisconsin, has received from the University of Wisconsin the degree of Doctor of Science, *honoris causa*. It will be remembered that he was the translator of Helmholtz's classical work on the ophthalmoscope.